

## Acupuncture

Acupuncture is one of the oldest, most commonly used medical procedures in the world. Originating in China more than 2,000 years ago, acupuncture began to become better known in the United States in 1971, when *New York Times* reporter James Reston wrote about how doctors in China used needles to ease his abdominal pain after surgery. Research shows that acupuncture is beneficial in treating a variety of health conditions.

The term acupuncture describes a family of procedures involving stimulation of anatomical points on the body by a variety of techniques. American practices of acupuncture incorporate medical traditions from China, Japan, Korea, and other countries. The acupuncture technique that has been most studied scientifically involves penetrating the skin with thin, solid, metallic needles that are manipulated by the hands or by electrical stimulation.

In the past two decades, acupuncture has grown in popularity in the United States. A Harvard University study published in 1998 estimated that Americans made more than 5 million visits per year to acupuncture practitioners.<sup>1</sup> The report from a Consensus Development Conference on Acupuncture held at the National Institutes of Health (NIH) in 1997 stated that acupuncture is being “widely” practiced—by thousands of physicians, dentists, acupuncturists, and other practitioners—for relief or prevention of pain and for various other health conditions.<sup>2</sup>

NIH has funded a variety of research projects on acupuncture. These grants have been awarded by the National Center for Complementary and Alternative Medicine (NCCAM), the Office of Alternative Medicine (OAM, NCCAM’s predecessor), and other NIH Institutes and Centers.

This Research Report provides general information about acupuncture, research summaries, and a resource section. Terms that are underlined are defined at the end of this report.

### Acupuncture Theories

Traditional Chinese medicine theorizes that there are more than 2,000 acupuncture points on the human body, and that these connect with 12 main and

8 secondary pathways called meridians. Chinese medicine practitioners believe these meridians conduct energy, or qi (pronounced “chee”), throughout the body.

Qi is believed to regulate spiritual, emotional, mental, and physical balance and to be influenced by the opposing forces of yin and yang. According to traditional Chinese medicine, when yin and yang are balanced, they work together with the natural flow of qi to help the body achieve and maintain health. Acupuncture is believed to balance yin and yang, keep the normal flow of energy unblocked, and maintain or restore health to the body and mind.

Traditional Chinese medicine practices (including acupuncture, herbs, diet, massage, and meditative physical exercise) are all intended to improve the flow of qi.<sup>3</sup>

Western scientists have found meridians hard to identify because meridians do not directly correspond to nerve or blood circulation pathways. Some researchers believe that meridians are located throughout the body’s connective tissue<sup>4</sup>; others do not believe that qi exists at all.<sup>5,6</sup> Such differences of opinion have made acupuncture an area of scientific controversy.

### **Mechanisms of Action**

Several processes have been proposed to explain acupuncture’s effects, primarily those on pain. Acupuncture points are believed to stimulate the central nervous system (the brain and spinal cord) to release chemicals into the muscles, spinal cord, and brain. These chemicals either change the experience of pain or release other chemicals, such as hormones, that influence the body’s self-regulating systems. The biochemical changes may stimulate the body’s natural healing abilities and promote physical and emotional well-being.<sup>7</sup> There are three main mechanisms:

1. **Conduction of electromagnetic signals:** Western scientists have found evidence that acupuncture points are strategic conductors of electromagnetic signals. Stimulating points along these pathways through acupuncture enables electromagnetic signals to be relayed at a greater rate than under normal conditions. These signals may start the flow of pain-killing biochemicals, such as endorphins, and of immune system cells to specific sites in the body that are injured or vulnerable to disease.<sup>8,9</sup>
2. **Activation of opioid systems:** Research has found that several types of opioids may be released into the central nervous system during acupuncture treatment, thereby reducing pain.<sup>10</sup>
3. **Changes in brain chemistry, sensation, and involuntary body functions:** Studies have shown that acupuncture may alter brain chemistry by changing the release of neurotransmitters and neurohormones. Acupuncture has also been documented to affect the parts of the central nervous system related to sensation and involuntary body functions, such as immune reactions and processes whereby a person’s blood pressure, blood flow, and body temperature are regulated.<sup>3,11,12</sup>

Preclinical studies have documented acupuncture's effects, but they have not been able to fully explain how acupuncture works within the framework of the Western system of medicine.<sup>13-18</sup>

According to the NIH Consensus Statement on Acupuncture:

Acupuncture as a therapeutic intervention is widely practiced in the United States. While there have been many studies of its potential usefulness, many of these studies provide equivocal results because of design, sample size, and other factors. The issue is further complicated by inherent difficulties in the use of appropriate controls, such as placebos and sham acupuncture groups. However, promising results have emerged, for example, showing efficacy of acupuncture in adult postoperative and chemotherapy nausea and vomiting and in postoperative dental pain. There are other situations such as addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia, myofascial pain, osteoarthritis, low back pain, carpal tunnel syndrome, and asthma, in which acupuncture may be useful as an adjunct treatment or an acceptable alternative or be included in a comprehensive management program. Further research is likely to uncover additional areas where acupuncture interventions will be useful.<sup>7</sup>

Increasingly, acupuncture is complementing conventional therapies. For example, doctors may combine acupuncture and drugs to control surgery-related pain in their patients.<sup>19</sup> By providing both acupuncture and certain conventional anesthetic drugs, some doctors have found it possible to achieve a state of complete pain relief for some patients.<sup>10</sup> They also have found that using acupuncture lowers the need for conventional pain-killing drugs and thus reduces the risk of side effects for patients who take the drugs.<sup>20,21</sup>

Currently, one of the main reasons Americans seek acupuncture treatment is to relieve chronic pain, especially from conditions such as arthritis or lower-back disorders.<sup>22,23</sup> Some clinical studies show that acupuncture is effective in relieving both chronic (long-lasting) and acute or sudden pain, but other research indicates that it provides no relief from chronic pain.<sup>24</sup> Additional research is needed to provide definitive answers.

## **FDA's Role**

The U.S. Food and Drug Administration (FDA) approved acupuncture needles for use by licensed practitioners in 1996. The FDA requires manufacturers of acupuncture needles to label them for single use only.<sup>25</sup> Relatively few complications from the use of acupuncture have been reported to the FDA when one considers the millions of people treated each year and the number of acupuncture needles used. Still, complications have resulted from inadequate sterilization of needles and from improper delivery of treatments. When not delivered properly, acupuncture can cause serious adverse effects, including infections and punctured organs.<sup>26</sup>

## Research Sponsored by NCCAM and OAM

NCCAM and OAM have supported scientific research to find out more about acupuncture. Examples of recent NCCAM-supported projects include:

- Studying the safety and effectiveness of acupuncture treatment for osteoarthritis of the knee.
- Investigating whether electroacupuncture works for chronic pain and inflammation (and, if so, how).
- Finding out how acupuncture affects the nervous system, by using MRI (magnetic resonance imaging) technology.
- Bringing together leaders from the Oriental medicine and conventional medicine communities to collaboratively study the safety and effectiveness of acupuncture and further develop the standards for clinical trials.
- Studying whether acupuncture can decrease the release of adrenalin in heart patients and improve their survival and quality of life. Adrenaline can make the heart beat faster and can thereby contribute to heart failure.
- Looking at the effectiveness of acupuncture for treating high blood pressure.
- Studying the effects of acupuncture on the symptoms of advanced colorectal cancer.
- Testing the safety and effectiveness of acupuncture for a type of depression called major depression.

With regard to earlier findings, researchers at the University of Maryland in Baltimore, with the support of OAM, conducted a randomized controlled clinical trial and found that patients treated with acupuncture after dental surgery had less intense pain than patients who received a placebo.<sup>19</sup> Scientists at the university also found that older people with osteoarthritis experienced significantly more pain relief after using conventional drugs and acupuncture together than those using conventional therapy alone.<sup>27</sup> OAM also funded several preliminary studies on acupuncture:

- In one small randomized controlled clinical trial, more than half of 11 women with a major depressive episode who were treated with acupuncture improved significantly.<sup>28</sup>
- In another controlled clinical trial, nearly half of the seven children with attention deficit hyperactivity disorder who underwent acupuncture treatment showed some improvement in their symptoms. Researchers concluded that acupuncture was a useful alternative to standard medication for some children with this condition.<sup>29</sup>
- In a third small controlled study, eight pregnant women were given a type of acupuncture treatment called moxibustion to reduce the rate of breech births, in which the fetus is positioned for birth feet-first instead of the normal position of head-first. Researchers found the treatment to be safe, but they were uncertain whether it was effective.<sup>30</sup> Then, researchers reporting in the November 11, 1998, issue of the *Journal of the American Medical Association* conducted a larger randomized controlled clinical trial using moxibustion for breech births. They found that moxibustion applied to 130 pregnant women presenting breech significantly increased the number of normal head-first births.<sup>31</sup>

## Acupuncture and You

The use of acupuncture, like the use of many other complementary and alternative medicine (CAM) treatments, has produced a good deal of anecdotal evidence. Much of this evidence comes from people who report their own successful use of the treatment. If a treatment appears to be safe and patients report recovery from their illness or condition after using it, others may decide to use the treatment. However, scientific research may not support the anecdotal reports.

Lifestyle, age, physiology, and other factors combine to make every person different. A treatment that works for one person may not work for another who has the very same condition. You as a health care consumer (especially if you have a preexisting medical condition) should discuss any CAM treatment, including acupuncture, with your health care practitioner. Do not rely on a diagnosis of disease by an acupuncture practitioner who does not have substantial conventional medical training. If you have received a diagnosis from a doctor and have had little or no success using conventional medicine, you may wish to ask your doctor whether acupuncture might help.

### Finding a Licensed Acupuncture Practitioner

Health care practitioners can be a resource for referral to practitioners of acupuncture, as more are becoming aware of this CAM therapy. More medical doctors, including neurologists, anesthesiologists, and specialists in physical medicine, are becoming trained in acupuncture, traditional Chinese medicine, and other CAM therapies. In addition, national organizations (consult your local library or search with a Web browser) may provide referrals to practitioners, although some organizations may encourage the use of their practices.

#### **Check a practitioner's credentials.**

A practitioner who is licensed and credentialed may provide better care than one who is not. About 40 states have established training standards for acupuncture certification, but states have varied requirements for obtaining a license to practice acupuncture.<sup>32</sup> Although proper credentials do not ensure competency, they do indicate that the practitioner has met certain standards to treat patients through the use of acupuncture.

#### **Check treatment cost and insurance coverage.**

A practitioner should inform you about the estimated number of treatments needed and how much each will cost. If this information is not provided, ask for it. Treatment may take place over a few days or for several weeks or more. Physician acupuncturists may charge more than nonphysician practitioners. Check with your insurer before you start treatment to see whether acupuncture will be covered for your condition and, if so, to what extent. Some plans require preauthorization for acupuncture.

### **Check treatment procedures.**

Ask about the treatment procedures that will be used and their likelihood of success for your condition or disease. You also should make certain that the practitioner uses a new set of disposable needles in a sealed package every time. The FDA requires the use of sterile, nontoxic needles that bear a labeling statement restricting their use to qualified practitioners. The practitioner also should swab the puncture site with alcohol or another disinfectant before inserting the needle.

During your first office visit, the practitioner may ask you at length about your health condition, lifestyle, and behavior. The practitioner will want to obtain a complete picture of your treatment needs and behaviors that may contribute to the condition. Inform the acupuncturist about all treatments or medications you are taking and all medical conditions you have.

### **The Sensation of Acupuncture**

Acupuncture needles are metallic, solid, and hair-thin. People experience acupuncture differently, but most feel no or minimal pain as the needles are inserted. Some people are energized by treatment, while others feel relaxed.<sup>33</sup> Improper needle placement, movement of the patient, or a defect in the needle can cause soreness and pain during treatment.<sup>34</sup> This is why it is important to seek treatment from a qualified acupuncture practitioner.

### **For More Information**

- **NCCAM Clearinghouse**

Toll-free in the U.S.: 1-888-644-6226

International: 301-519-3153

TTY (for deaf and hard-of-hearing callers): 1-866-464-3615

E-mail: [info@nccam.nih.gov](mailto:info@nccam.nih.gov)

Web site: [nccam.nih.gov](http://nccam.nih.gov)

Address: NCCAM Clearinghouse, P.O. Box 7923, Gaithersburg, MD 20898-7923

Fax: 1-866-464-3616

Fax-on-Demand service: 1-888-644-6226

The NCCAM Clearinghouse provides information on CAM, including acupuncture, and on NCCAM. Services include fact sheets, other publications, and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

- **CAM on PubMed**  
Web site: [www.nlm.nih.gov/nccam/camonpubmed.html](http://www.nlm.nih.gov/nccam/camonpubmed.html)

CAM on PubMed, a database on the Internet developed jointly by NCCAM and the National Library of Medicine, offers citations to (and in most cases, brief summaries of) articles on CAM in scientifically based, peer-reviewed journals. CAM on PubMed also links to many publisher Web sites, which may offer the full text of articles.

- **National Institutes of Health (NIH)**  
Web site: [www.nih.gov](http://www.nih.gov)  
Address: Building 1, 1 Center Drive, Bethesda, MD 20892

NIH's mission is to uncover new knowledge that will lead to better health for everyone. Comprising 27 separate components, mainly Institutes and Centers, NIH works toward that mission by conducting and supporting research, training researchers, and fostering communication of medical information. Descriptions of each of the Institutes and Centers, along with their research priorities and links to their Web sites, can be accessed from the main NIH Web site at [www.nih.gov](http://www.nih.gov).

- **Combined Health Information Database (CHID)**  
Web site: [chid.nih.gov](http://chid.nih.gov)  
E-mail: [chid@erie.com](mailto:chid@erie.com)

CHID Online is a searchable and user-friendly database produced by more than a dozen health-related agencies of the Federal Government, including NCCAM. This database provides titles, abstracts, and availability information for health information and health education resources, including acupuncture and traditional Chinese medicine.

- **ClinicalTrials.gov**  
Web site: [www.clinicaltrials.gov](http://www.clinicaltrials.gov)

ClinicalTrials.gov is a database of information on clinical trials, primarily in the United States and Canada, for a wide range of diseases and conditions. It is sponsored by NIH and the FDA.

- **Computer Retrieval of Information on Scientific Projects (CRISP)**  
Web site: [crisp.cit.nih.gov](http://crisp.cit.nih.gov)

CRISP is a searchable database of federally funded biomedical research projects conducted at universities, hospitals, and other research institutions. The database, maintained by the Office of Extramural Research at NIH, includes projects funded by NIH and other health-related Federal agencies.

- **NIH Consensus Program Information Center**  
Toll-free in the U.S.: 1-888-644-2667  
E-mail: [consensus\\_statement@nih.gov](mailto:consensus_statement@nih.gov)  
Fax: 301-593-9485  
Address: P.O. Box 2577, Kensington, MD 20891

This Center issued the NIH Consensus Statement on Acupuncture (1997). To access this statement, go to [odp.od.nih.gov/consensus/cons/107/107\\_statement.htm](http://odp.od.nih.gov/consensus/cons/107/107_statement.htm).

## Definitions

**Anecdotal evidence:** Data based on reports of usually unscientific observation. Anecdotes are often accounts of an individual's personal experience.

**Attention deficit hyperactivity disorder:** A group of disorders of behavior. Symptoms often include a tendency to act on impulse and problems with paying attention.

**Clinical trial:** Test of a treatment's effects in humans. Clinical trials help researchers find out whether a promising treatment is safe and effective for people. They also tell scientists which treatments are more effective than others.

**Complementary and alternative medicine (CAM):** Health care practices and products that are not presently considered to be part of conventional medicine. **Complementary** medicine is used **together with** conventional medicine. **Alternative** medicine is used **in place of** conventional medicine. **Conventional medicine** is medicine as practiced by holders of M.D. (Doctor of Medicine) or D.O. (Doctor of Osteopathic Medicine) degrees and by their allied health professionals, such as physical therapists, psychologists, and registered nurses. Other terms for conventional medicine include allopathy; Western, mainstream, orthodox, and regular medicine; and biomedicine.

**Depression:** An illness that involves the body, mood, and thoughts. Among its symptoms are persistent sad, anxious, or "empty" feelings and changes in sleeping and/or eating patterns. Depression comes in various types.

**Electroacupuncture:** A variation of traditional acupuncture treatment in which acupuncture or needle points are stimulated electronically.

**Electromagnetic signal:** A minute electrical impulse that transmits information through and between nerve cells. For example, electromagnetic signals convey information about pain and other sensations within the body's nervous system.

**Fibromyalgia:** A complex chronic condition having multiple symptoms, including muscle pain, fatigue, and tenderness in precise, localized areas, particularly in the neck, spine, shoulders, and



hips. People with this syndrome may also experience sleep disturbances, morning stiffness, irritable bowel syndrome, anxiety, and other symptoms.

**Major depressive episode:** A period of depression during which a person experiences a combination of symptoms that interfere with the ability to work, study, sleep, eat, and enjoy once-pleasurable activities. Symptoms vary, but may include persistent feelings of sadness, anxiety, emptiness, hopelessness, guilt, and restlessness or suicidal thoughts. People may also experience persistent physical symptoms that do not respond to treatment, such as headaches, digestive disorders, and chronic pain.

**Meridian:** A traditional Chinese medicine term for each of the 20 pathways throughout the body for the flow of qi, or vital energy, accessed through acupuncture points.

**Moxibustion:** The use of dried herbs in acupuncture. Generally, moxibustion in the United States involves the use of sticks of a compressed herb(s) and is an adjunct to acupuncture rather than a part of acupuncture.

**Neurohormone:** A chemical substance made by tissue in the body's nervous system that can change the structure or function, or direct the activity, of an organ or organs.

**Neurotransmitter:** A biochemical substance that stimulates or inhibits nerve impulses in the brain that relay information about external stimuli and sensations, such as pain.

**Opioid:** A synthetic or naturally occurring chemical in the brain that may reduce pain and induce sleep.

**Placebo:** An inactive pill or sham procedure given to a participant in a research study as part of a test of the effects of another substance or treatment. Scientists use placebos to get a true picture of how the substance or treatment under investigation affects participants. In recent years, the definition of placebo has been expanded to include such things as aspects of interactions between patients and their health care providers that may affect their expectations and the study's outcomes.

**Preclinical study:** A study done to obtain information about a treatment's safety and side effects when given at different doses to animals or to cells grown in the laboratory.

**Qi:** The Chinese term for vital energy or life force. It is pronounced "chee."

**Randomized controlled clinical trial:** A type of clinical trial using two groups of people; one group (treatment group) receives the treatment and the other (control group) does not. Participants are assigned to either the treatment group or the control group at random, to prevent bias in the research.

**Traditional Chinese medicine:** Traditional Chinese medicine (TCM) is the current name for an ancient system of health care from China. TCM is based on a concept of balanced qi (pronounced “chee”), or vital energy, that is believed to flow throughout the body. Qi is proposed to regulate a person’s spiritual, emotional, mental, and physical balance and to be influenced by the opposing forces of yin (negative energy) and yang (positive energy). Disease is proposed to result from the flow of qi being disrupted and yin and yang becoming imbalanced. Among the components of TCM are herbal and nutritional therapy, restorative physical exercises, meditation, acupuncture, and remedial massage.

**Yang:** The Chinese concept of positive energy and forces in the universe and human body. Acupuncture is believed to remove yang imbalances and bring the body into balance.

**Yin:** The Chinese concept of negative energy and forces in the universe and human body. Acupuncture is believed to remove yin imbalances and bring the body into balance.

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